SERVICE MANUAL PM310

marantz

model PM310

Stereophonic Amplifier

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ Company has created the ultimate in stereo sound. Only original MARANTZ parts can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

Parts for your MARANTZ stereo are generally available within 72 hours throughout the nation via a toll-free line to our National Parts Depot in California. The sales professionals who take your call immediately refer to their own desk top computer terminal and can quickly determine the availability and price information you require. If for some reason, your order should exceed our available stock, we usually can instantly provide an alternate replacement part or current delivery information. When the order is placed and confirmed, the computer simultaneously generates "hard copy" orders at the distribution center. As hard copies come directly from the computer to the national parts depot, your requested stock is assembled and prepared for shipment and placed on the first available carrier for delivery to you.

ORDERING PARTS

Phone orders will eliminate mail delays, and we encourage the use of this method. If you order by mail, use MARANTZ parts order forms which are available from our National Parts Depot located at the following address:

SUPERSCOPE NATIONAL PARTS DEPARTMENT
20525 Nordhoff Street
Chatsworth, California 91311
Phone: 1-800-423-5108
1-213-998-9333

The following information must be supplied to eliminate delays in processing your order:

1. Complete address.
2. Complete part numbers.
3. Complete description of parts.
4. Model number for which part is required (indicate MARANTZ).
5. Account number (for account customers only).

Direct consumers will be provided with the current retail prive quotation on availabe parts in order to advise them of the cost of the parts and shipping.

OVERSEAS PARTS ORDERING

Parts may also be ordered from the following overseas addresses:

CANADA

Superscope Canada, Ltd.
3710 Nashua Drive
Mississauga
Ontario, Canada L4V1M5

AUSTRALIA

Superscope (Australasia) Pty., Ltd.
32 Cross Street (P.O.Box 604)
Brookvale 2100 N.S.W.
Australia

JAPAN

Marantz Japan, Inc.
3622 Kamitsuruma
Sagamihara Shi
Kanagawa, Japan

EUROPE

Superscope Europe, S.A.
Avenue Leopold III, 2
7120 Peronnes-Lez-Binche
Belgium

Marantz France
Rue Louis Armand 9
92600 Asnieres
Hauts-de-Seine
France

Marantz Audio U.K. Ltd.
London Road, 203
Staines
Middlesex
England

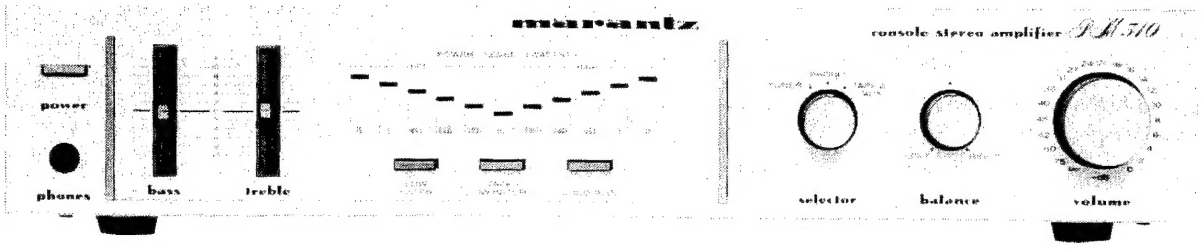
Superscope GmbH
Max-Planck-Strass 22
D-6072 Dreieich
West Germany

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.

marantz®
We sound better.

TABLE OF CONTENTS

MODEL PM-310 STEREOPHONIC AMPLIFIER



1. INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for the Marantz PM 310 Stereo Console Amplifier. Servicing information and voltage data included in this manual are intended for use by knowledgeable and experienced personnel only. All instructions should be read carefully. No attempt should be made to proceed without a good understanding of circuitry operation.
The parts list furnishes complete ordering information. Most replacement parts should be ordered from the Marantz Company. However, a simple description is included for parts which can be obtained locally.

2. PRE-AMPLIFIER

Signals from the TUNER and AUX terminals are taken to the SELECTOR SWITCH (SS02).
Signals from the PHONO terminals pass through the phono amplifier (Q401) where they are amplified by 35.5 dB and at the same time undergo RIAA equalization, before going to the SELECTOR SWITCH (SS02). After being selected by the SELECTOR SWITCH, the incoming signals are taken to the TAPE MONITOR switch and TAPE OUT terminals.
Signals which enter from the TAPE IN terminals are taken to the TAPE MONITOR SWITCH.
Signals which are selected by the TAPE MONITOR SWITCH are taken to the BALANCE and VOLUME potentiometers, and then enter the main amplifier.

3. MAIN AMPLIFIER

The main amplifier contains an 6 dB/OCT type high pass filter network which can be switched in and out of circuit by means of the LOW FILTER switch.

The main amplifier has a gain of 38.5 dB, and the tone control circuit is included in the feedback circuit to control BASS and TREBLE.

4. TROUBLESHOOTING ANALYSIS

1. Excessive line consumption
   a. Check for shorted Q801.
   b. Check for shorted transistor Q729, through Q732.
   c. Check for open Q709, Q710, R725, R726.
2. No line consumption or zero bias voltage
   a. Check line cord, fuse, check for shorted Q709, Q710, R725, R726.
   b. Check for open rectifiers Q801 or open L001.
3. High hum and noise level
   a. Check filter capacitors C808, C809, C801, C803.
   b. Check TR Q807, Q808.

5. POWER AMPLIFIER ADJUSTMENT

ADJUSTMENT OF IDLING CURRENT

Connect a DC voltmeter to between emitters Q729 and Q731. Adjust R725 until 11 mV is reached. Likewise, adjust Q730, Q732 and R726.

6. POWER LED METER ADJUSTMENT

Adjust the Speaker Terminal to @1 kHz at rated OUTPUT (12.6V). Adjust the RX07 so that 20W LED lights up. Adjust the RX08 for another channel.

7. TEST EQUIPMENT REQUIRED FOR SERVICING

Table 1 lists the test equipment required for servicing the PM 310 Stereo Console Amplifier. The wattmeter, AC voltmeter, and variable autotransformer may be assembled as a test fixture as shown schematically in Figure 1. The load resistors and AC ammeter may be assembled into a second test fixture as shown in Figure 2.

8. PERFORMANCE VERIFICATION

TEST PROCEDURE

A. TEST EQUIPMENT

Refer to Table 1 for required test equipment.

B. PRELIMINARY PROCEDURES

1. Make the test setup shown in Figure 1 with the instrument controls set in the following positions:

Line Switch	OFF
Variable-line switch	Variable
Wattmeter Switch	ON
Variable Autotransformer	0 V (**fully CCW**)
Load	8 ohms (0.5 mfd–OFF)
Audio Generator	1 kHz
Output	5 V range
Gain	Minimum
AC Voltmeter	30 V range

2. Make sure that connections between the resistive load and the system terminals of the PM 310 have negligible resistance when compared with the resistance of the load itself. Appreciable resistance in wiring adds to the total load, resulting in inaccurate measurements of output power.

3. Connect amplifier output to load and connect AC cord to line power. Connect shorting plugs to the Phono input jacks of the PM 310.

Table 1. Test Equipment Required for Servicing

Item	Manufacturer and Model No.	Use
Distortion Analyzer Audio Oscillator AC Voltmeter	Sound Technology Model 1700B	Distortion measurements Sinewave and squarewave signal source voltage measurements (AC)
Oscilloscope	Tektronix Model T932 Philips Model 3232	Waveform analysis and trouble shooting and ASO alignment
Circuit Tester		Trouble shooting
DC Voltmeter	Fluke Model 8000 "Digital" Simpson Model 313, Triplet Model 801	Voltage measurements (DC)
AC Wattmeter	Simpson Model 1379	Monitors primary power to amplifier
AC Ammeter	Commercial Grade (1 ~ 10 A)	Monitors amplifier output under short circuit condition
Line Voltmeter	Simpson Model 1359	Monitors potential of primary power to amplifier
Variable Autotransformer	Superior Electronic Co., Powerstet Model 116B-10A	Adjusts level of primary power to amplifier
Shorting Plug	Use phono plug with 600 ohm across center pin and shell	Shorts amplifier input to eliminate noise pickup
Output Load (8 ohms, ±0.5% 100 W)	Commercial Grade	Provides 8-ohm load for amplifier output termination
Output Load (4 ohms, ±0.5% 100 W)	Commercial Grade	Provides 4-ohm load for amplifier output termination
Output Load Capacitor (0.5 mfd)	Mylar	Provides capacitive load for instability checks
AC Power Control Box	Optional Item. Fabricate in accordance with Figure 1	Monitors and controls primary power for amplifier
Amplifier Output Load Box	Optional Item. Fabricate in accordance with Figure 2	Provides various amplifier loads and can monitor shorted output

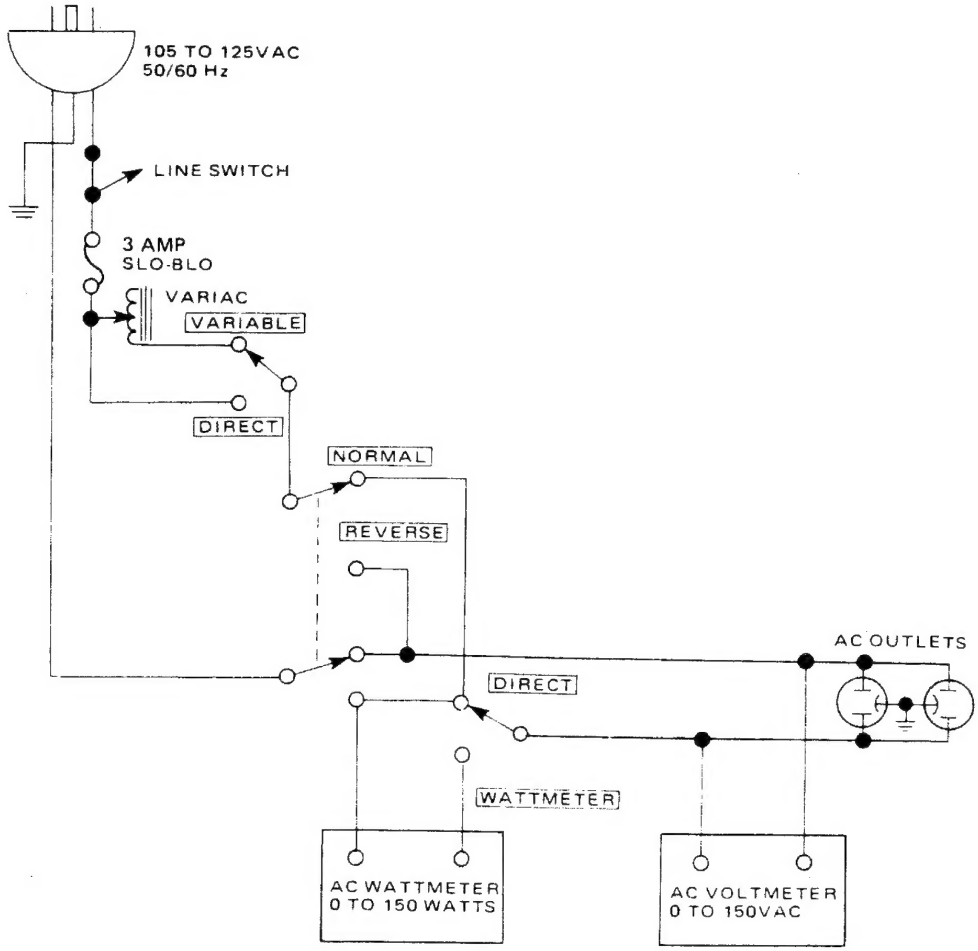


Figure 1. AC Power Control Box Simpligied Schematic

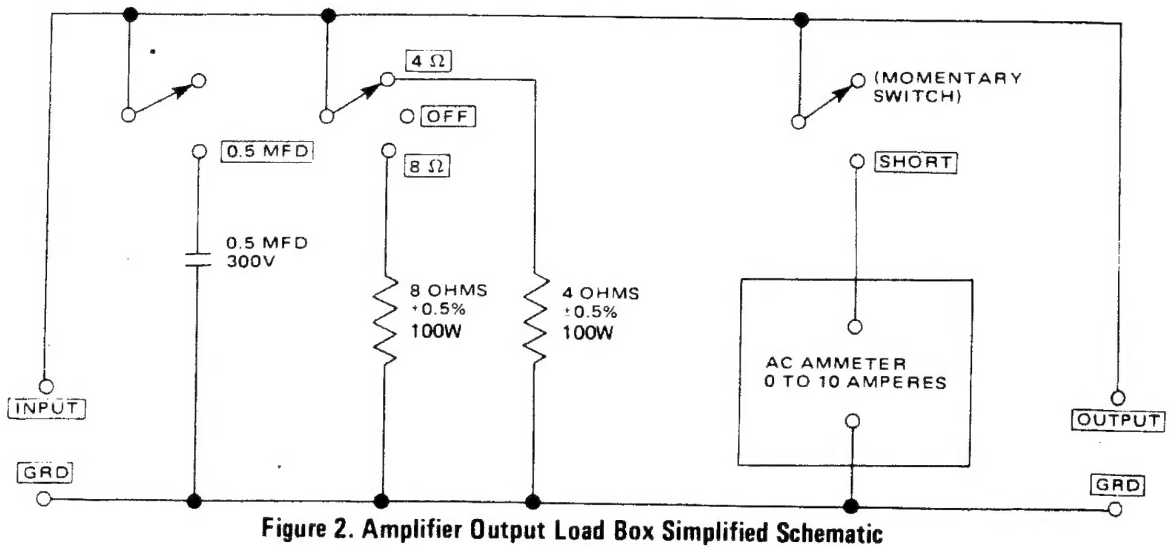


Figure 2. Amplifier Output Load Box Simplified Schematic

C. TOTAL HUM AND NOISE TEST

1. With shorting plugs connected to the Phono input jacks and an 8 ohm resistive load connected across the speaker system output terminals, connect a distortion analyzer across the load.

> **NOTE:**
> If the distortion analyzer does not contain a built-in voltmeter, an AC VTVM may be substituted.

2. Set the distortion analyzer controls for voltge measurements and apply power to the amplifier. Set the volume control fully CCW. Set the SELECTOR switch to PHONO.
3. If the distortion analyzer indicates more than 2.0 mV refer to the trouble analysis section of this manual.
4. Set the volume control fully CW. If the distortion analyzer indicates more than 20 mV, refer to the trouble analysis section of this manual.

D. MAXIMUM POWER OUTPUT

1. Connect the audio oscillator to the AUX input. Set audio oscillator frequency to 1 kHz. Set SELECTOR switch to AUX.
2. With the distortion analyzer connected across the output load (8-ohm), set the analyzer on the 30 VAC scale.
3. Turn the analyzer on and increase the audio oscillator output to 150 mV. The AC VTVM should read 12.6 VAC or more.

E. HARMONIC DISTORTION TEST

1. Set the frequency of the audio oscillator and the distortion analyzer to 20 kHz.
2. Set the controls of the analyzer for voltage measurement on the 30 volt scale.
3. Adjust the audio oscillator output level until the analyzer meter indicates 12.6-VAC.
4. Switch the distortion analyzer to Set Level and adjust SENSITIVITY for full scale reading on 0 ~ 1% scale.
5. Measure the total harmonic distortion with the analyzer and verify it is less than 0.3%.

> **NOTE:**
> Any parasitic oscillation in the amplifier will be displayed on the oscilloscope when capacitance is switched into the load.

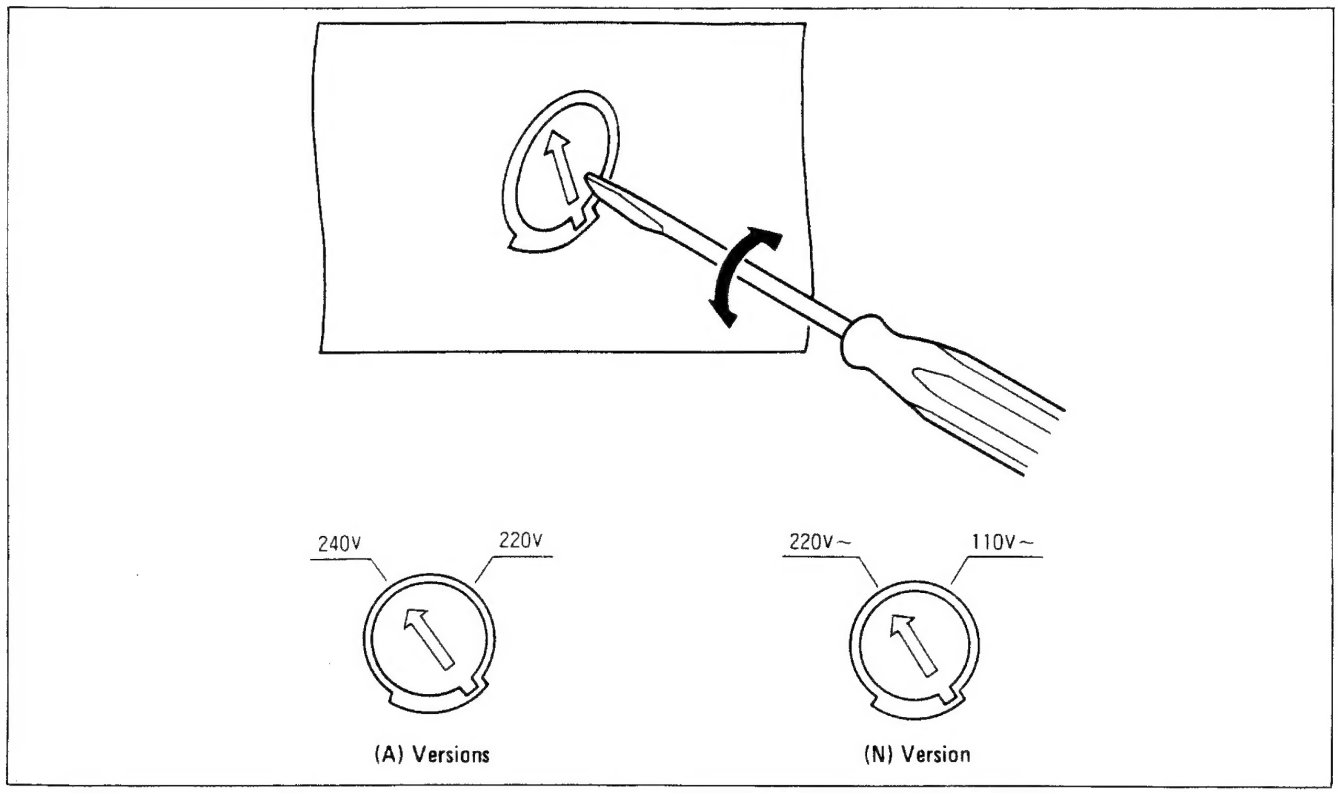
6. Switch the distortion analyzer back to SET LEVEL. (Do not readjust sensitivity of analyzer.)
7. Change the frequency of the audio oscillator and distortion analyzer to 1 kHz. Adjust audio oscillator output for a full scale reading on the 0 ~ 1% scale.
8. Measure the distortion, verifying it is no greater than 0.3%.
9. Repeat steps 7 and 8, changing frequency to 20 Hz. Distortion should be no more than 0.3%.
10. Check for parasitic oscillation; there should be none.

9. VOLTAGE CONVERSION

To convert the unit to a different power source voltage, change the position as illustrated in the drawing below.

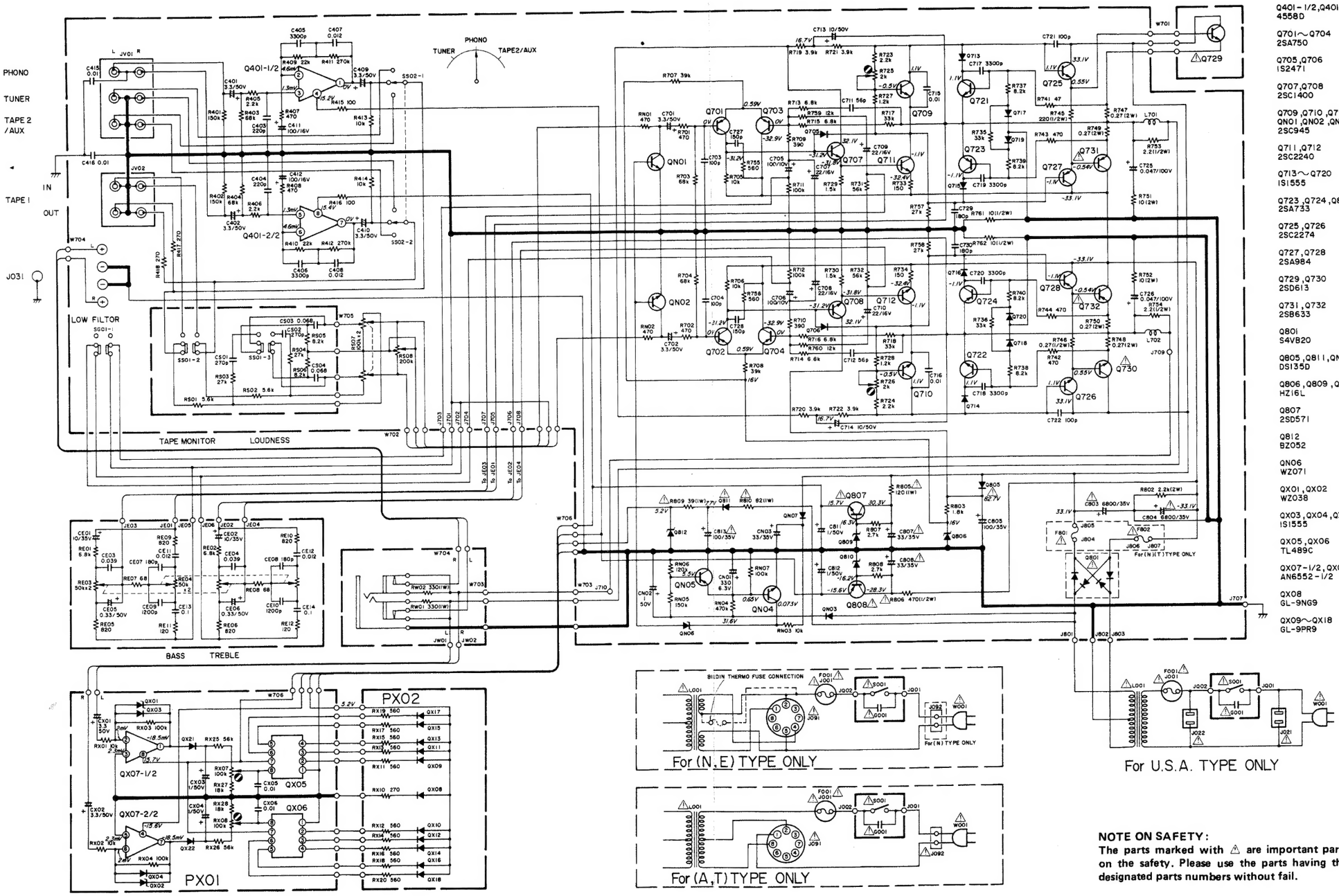
CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE. PLEASE DO NOT DISASSEMBLE THE VOLTAGE SELECTOR ABSOLUTELY.

Voltage Conversion Chart



Note on safety: The parts marked with ⚠ are important parts on the safety. Please use the parts having the designated parts number without fail.

10. SCHEMATIC DIAGRAM



Q401-1/2,Q401-2/2
4558D

Q701～Q704
2SA750

Q705,Q706
1S2471

Q707,Q708
2SC1400

Q709,Q710,Q721,Q722
QN01,QN02,QN04
2SC945

Q711,Q712
2SC2240

Q713～Q720
1S1555

Q723,Q724,Q808,QN05
2SA733

Q725,Q726
2SC2274

Q727,Q728
2SA984

Q729,Q730
2SD613

Q731,Q732
2SB633

Q801
S4VB20

Q805,Q811,QN03
DSI35D

Q806,Q809,Q810
HZ16L

Q807
2SD571

Q812
BZ052

QN06
WZ071

QX01,QX02
WZ038

QX03,QX04,QX21,QX22,QN07
1S1555

QX05,QX06
TL489C

QX07-1/2,QX07-2/2
AN6552-1/2

QX08
GL-9NG9

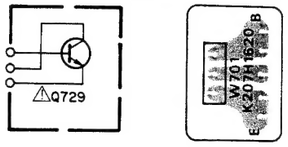
QX09～QX18
GL-9PR9

NOTE ON SAFETY:
The parts marked with ⚠ are important parts on the safety. Please use the parts having the designated parts numbers without fail.

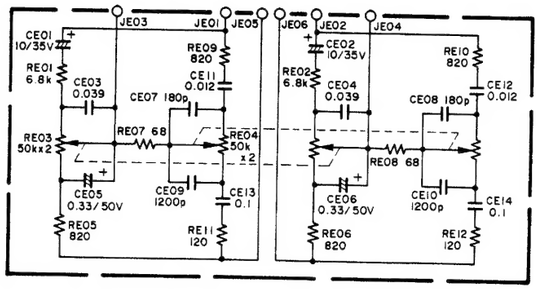
Components and wiring are subject to change for modification without notice.

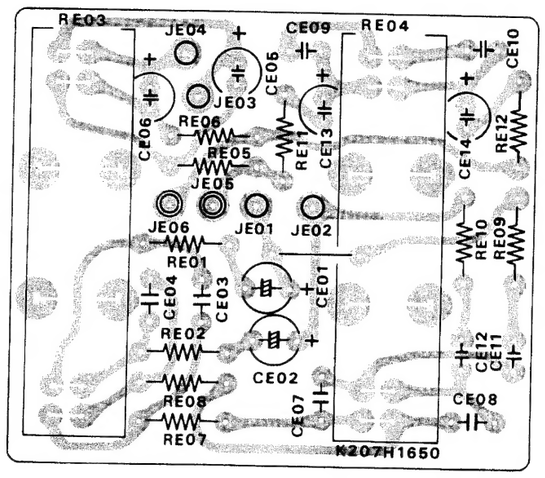
11. DIAGRAM AND COMPONENT LOCATIONS

11.2 Power TR. Assembly (P701) Schematic Diagram and Component Locations

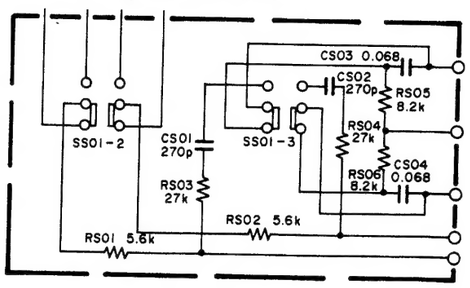


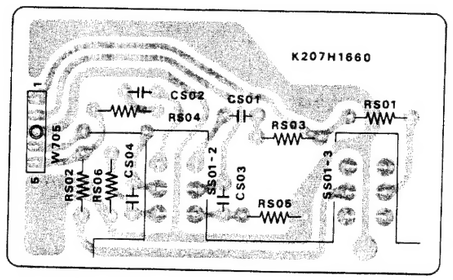
11.3 Tone Control Assembly (PE00) Schematic Diagram and Component Locations



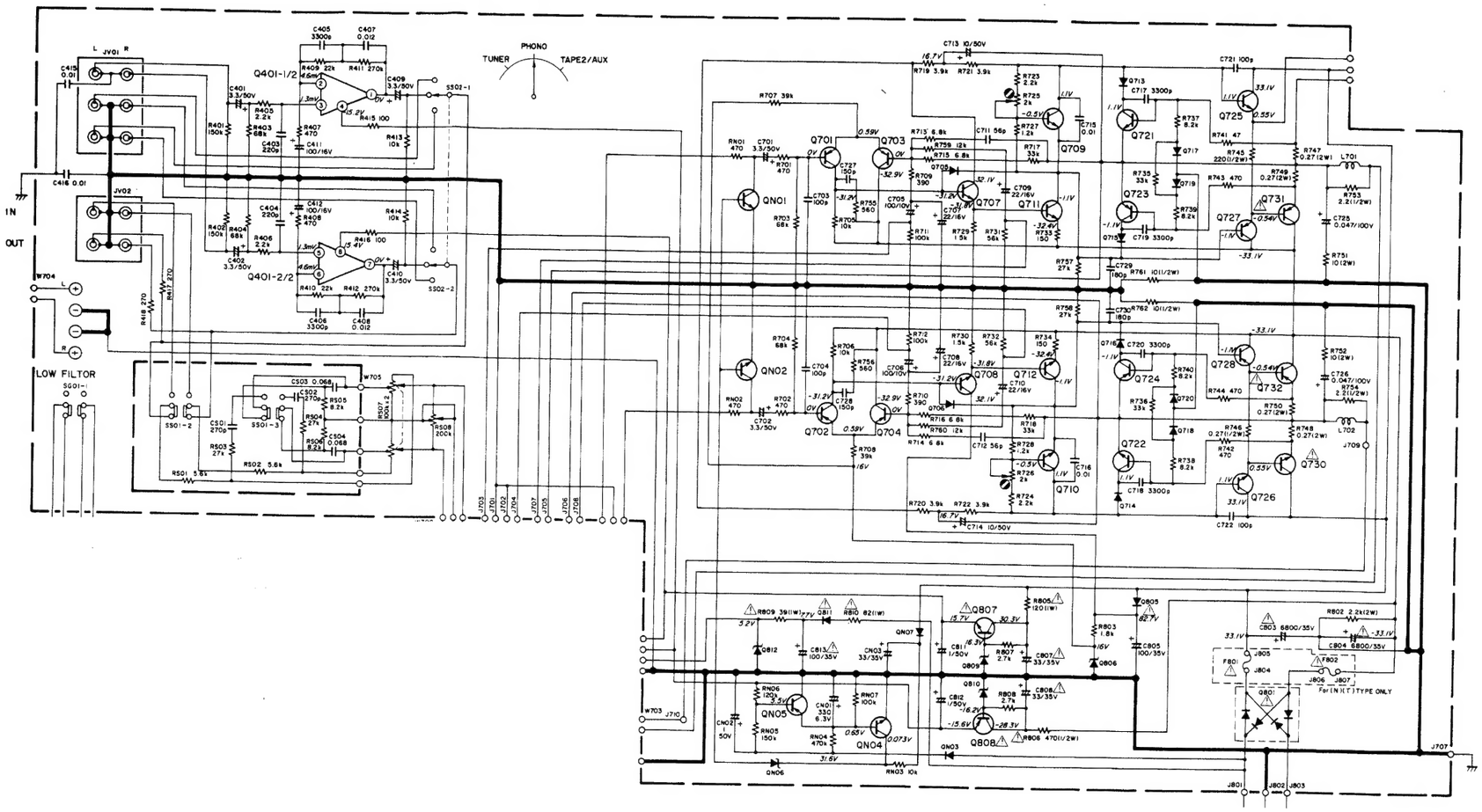


11.4 Switch/VR. Assembly (PS00) Schematic Diagram and Component Locations

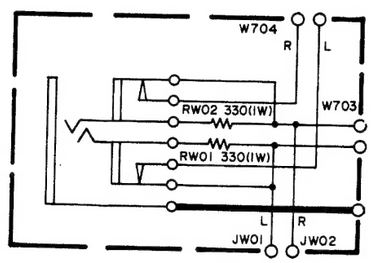


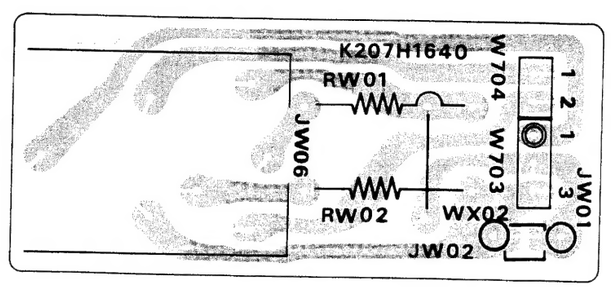


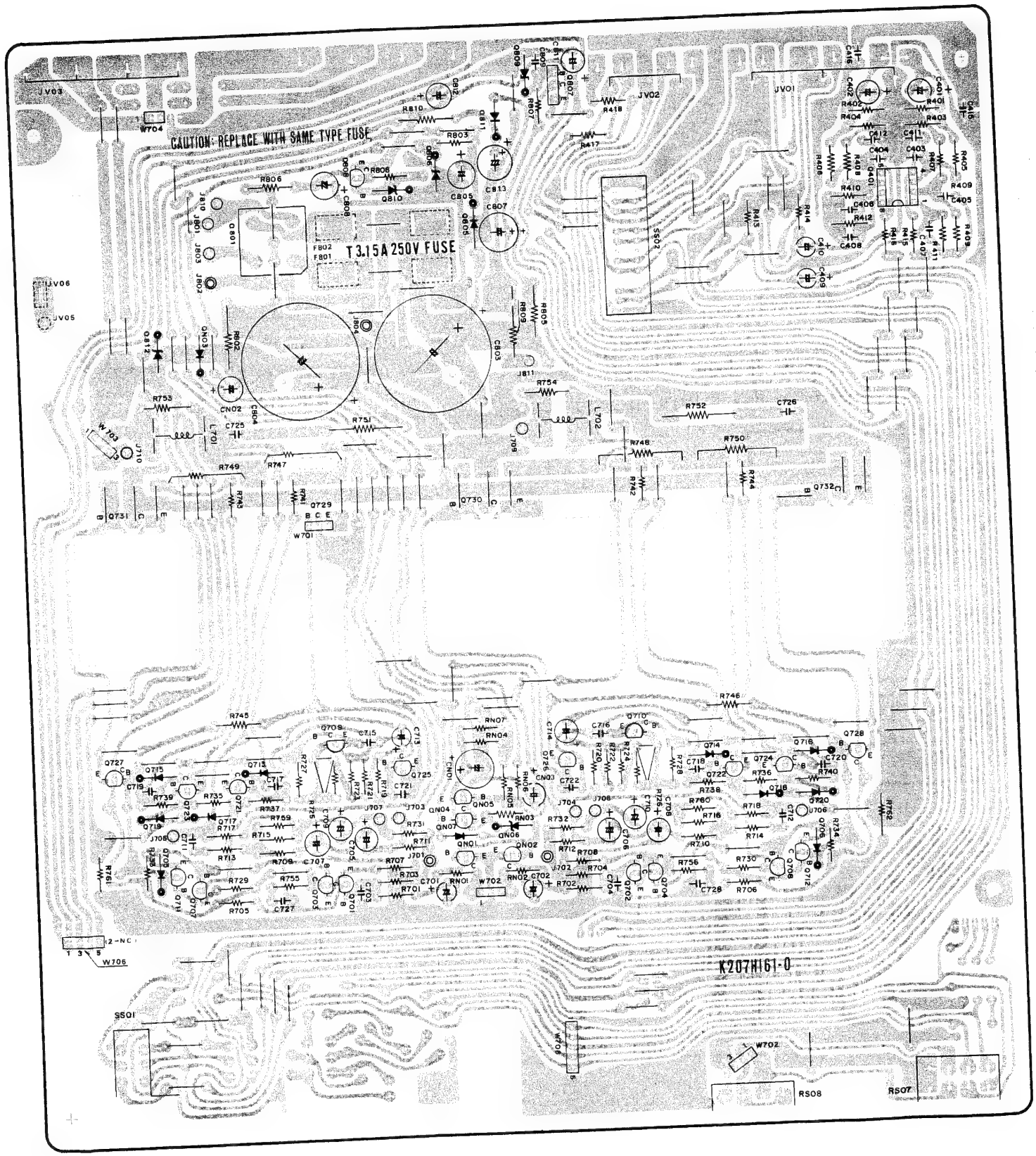
11.1 Main Assembly (P700) Schematic Diagram and Component Locations

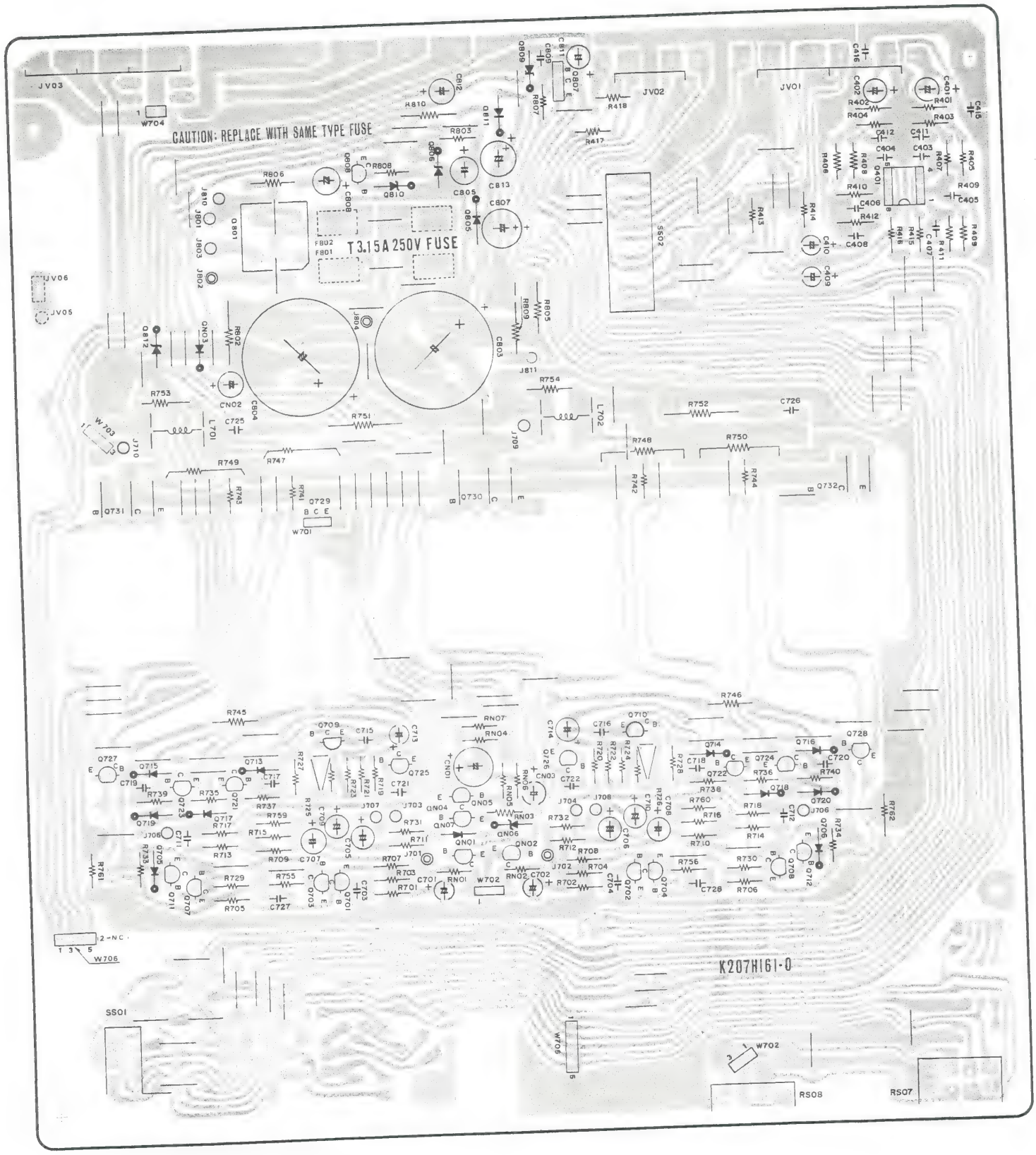


11.5 Phone Assembly (PW00) Schematic Diagram and Component Locations

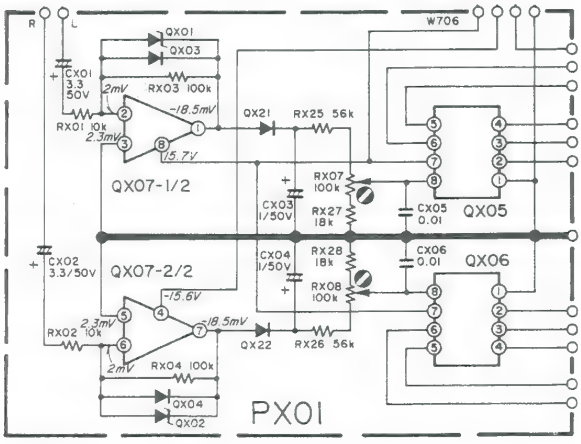


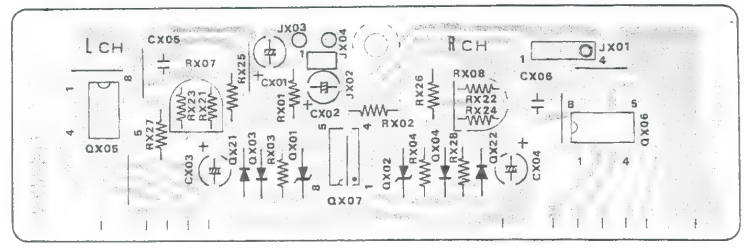



CAUTION: REPLACE WITH SAME TYPE FUSE.
T3.15A 250V FUSE
K207H161-0

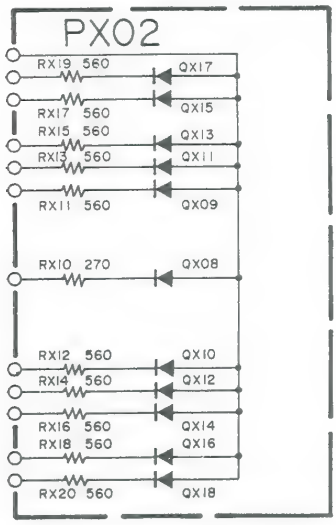

CAUTION: REPLACE WITH SAME TYPE FUSE
T 3.15A 250V FUSE
K207H161-0

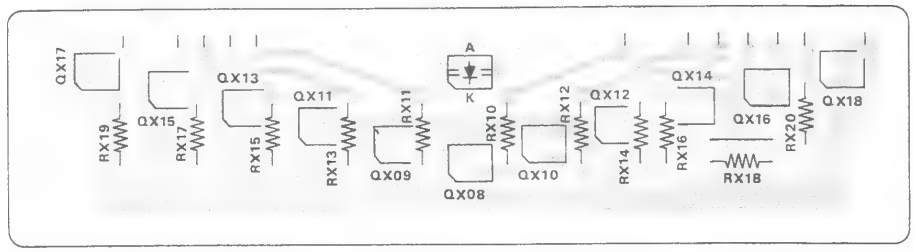
11.6 Led Level Meter Drive Assembly (PX01) Schematic Diagram and Component Locations



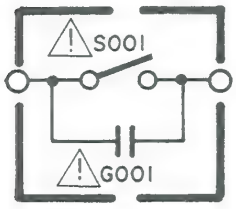


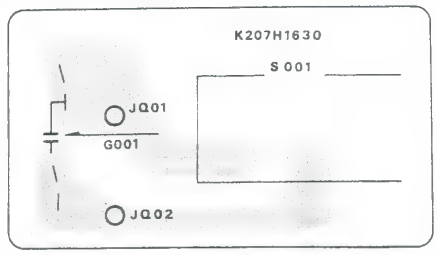
11.7 Led Level Meter Assembly (PX02) Schematic Diagram and Component Locations



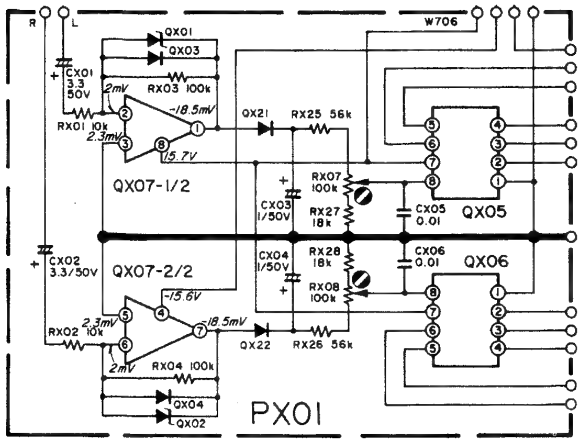


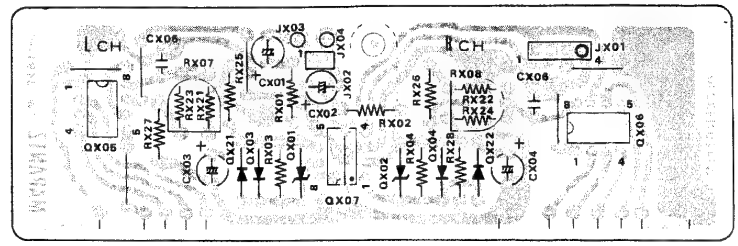
11.8 Power Switch Assembly (P001) Schematic Diagram and Component Locations



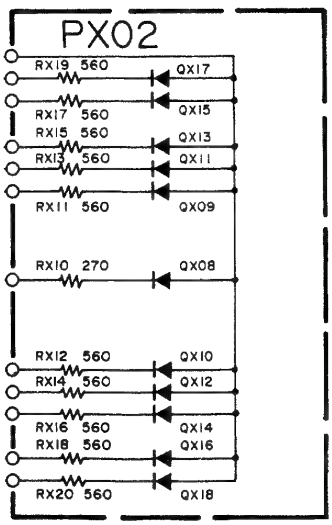


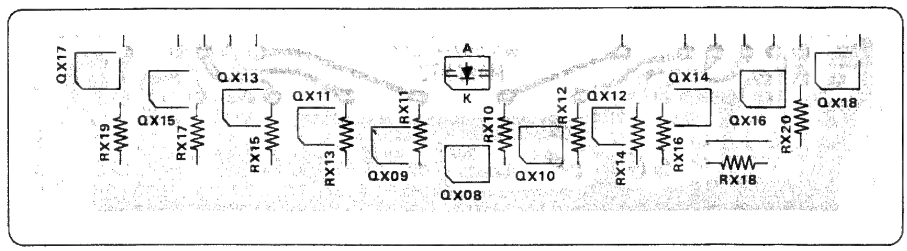
11.6 Led Level Meter Drive Assembly (PX01) Schematic Diagram and Component Locations



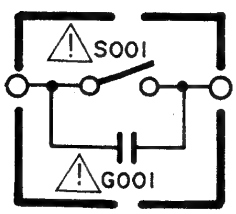


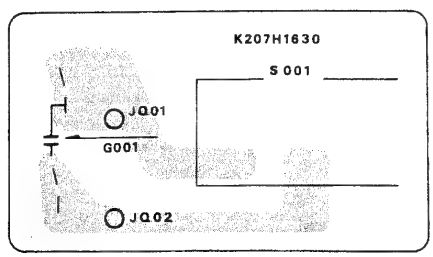
11.7 Led Level Meter Assembly (PX02) Schematic Diagram and Component Locations



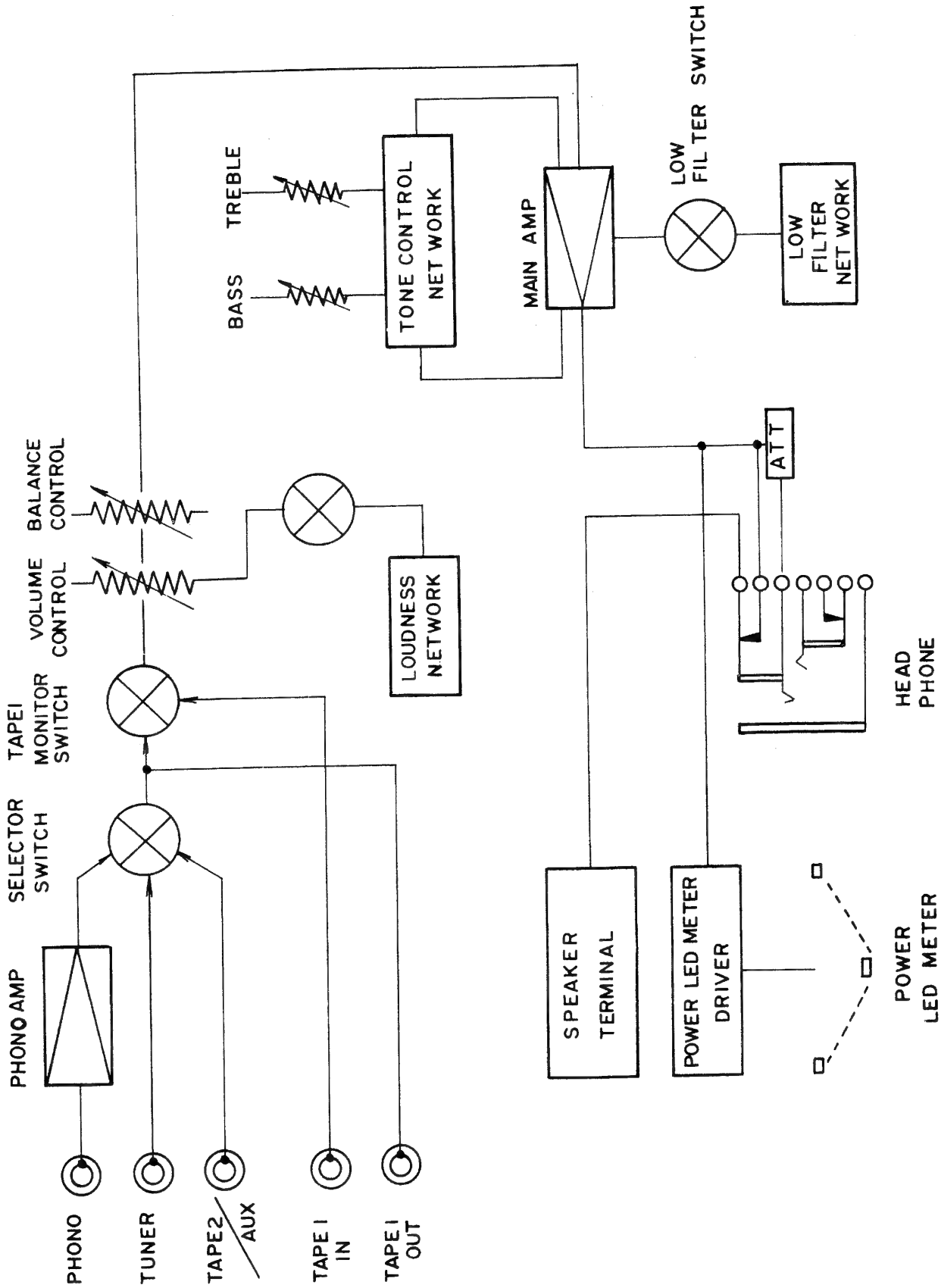


11.8 Power Switch Assembly (P001) Schematic Diagram and Component Locations



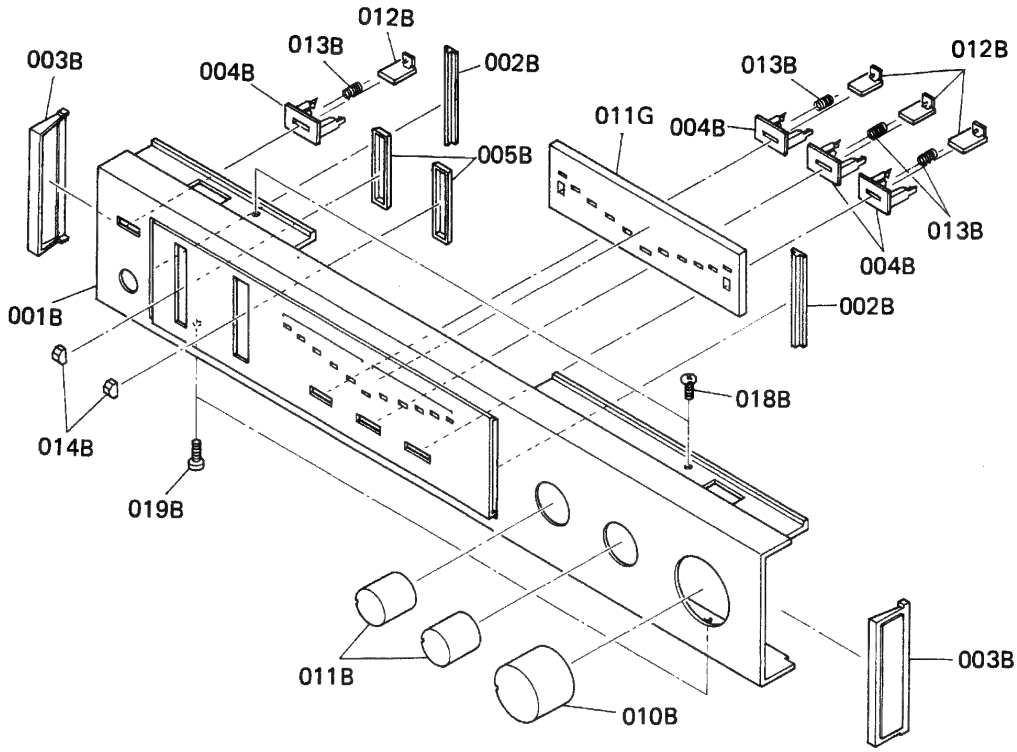


12. BLOCK DIAGRAM



13. EXPLOCED VIEW AND PARTS LIST

[C01-99] Front Panel

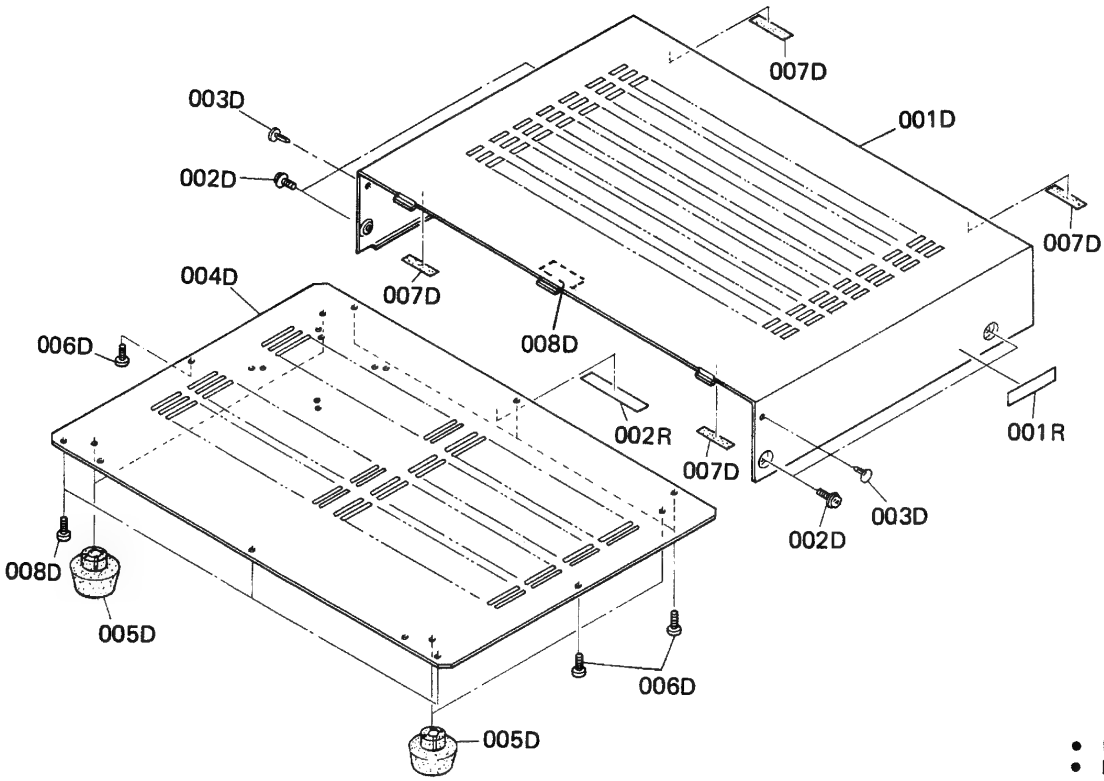


- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
A	1	1	1	207H063400	Front Panel Assembly
001B	1	1	1	207H063010	Escutcheon
002B	2	2	2	403H063020	Escutcheon
003B	2	2	2	403H067010	Cap
004B	4	4	4	403H259010	Bushing
005B	2	2	2	001H259110	Bushing
012B	4	4	4	403H154010	Knob
013B	4	4	4	403H115010	Spring
011G	1	1	1	208H118010	Spacer

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
010B	1	1	1	208H154010	Knob
011B	2	2	2	208H154020	Knob
014B	2	2	2	208H154050	Knob
018B	2	2	2	51300306B0	B.H. Tapped Screw B3 x 6
019B	2	2	2	51300306B0	B.H. Tapped Screw B3 x 6

[C02-99] Lid (Top and Bottom Cover)

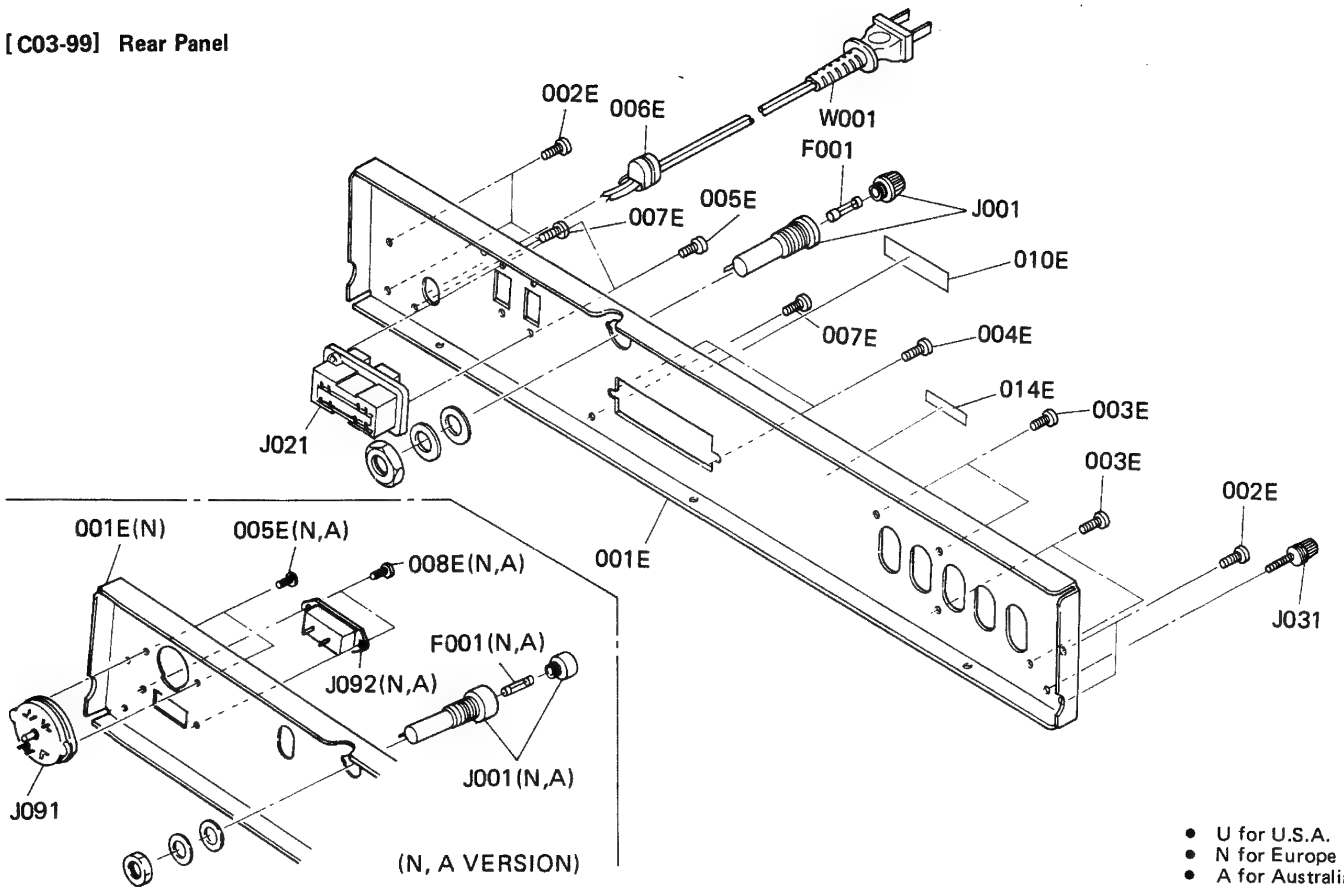


- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
001D	1	1	1	208H257010	Lid, Top Cover
002D	4	4	4	51260408U0	B.T. Screw B4 x 8
003D	2	2	2	2991259010	Bushing
004D	1	1	1	208H257020	Lid, Bottom Cover
005D	4	4	4	403H057010	Leg
006D	8	8	8	51280308B0	B.H. Tapped Screw B3 x 8
007D	4	4	4	2965118010	Spacer
008D	1	1	1	208H056010	Buffer

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
001R	1	1	1	2932861010	Label
002R	1	1	1	2578861010	Label

[C03-99] Rear Panel

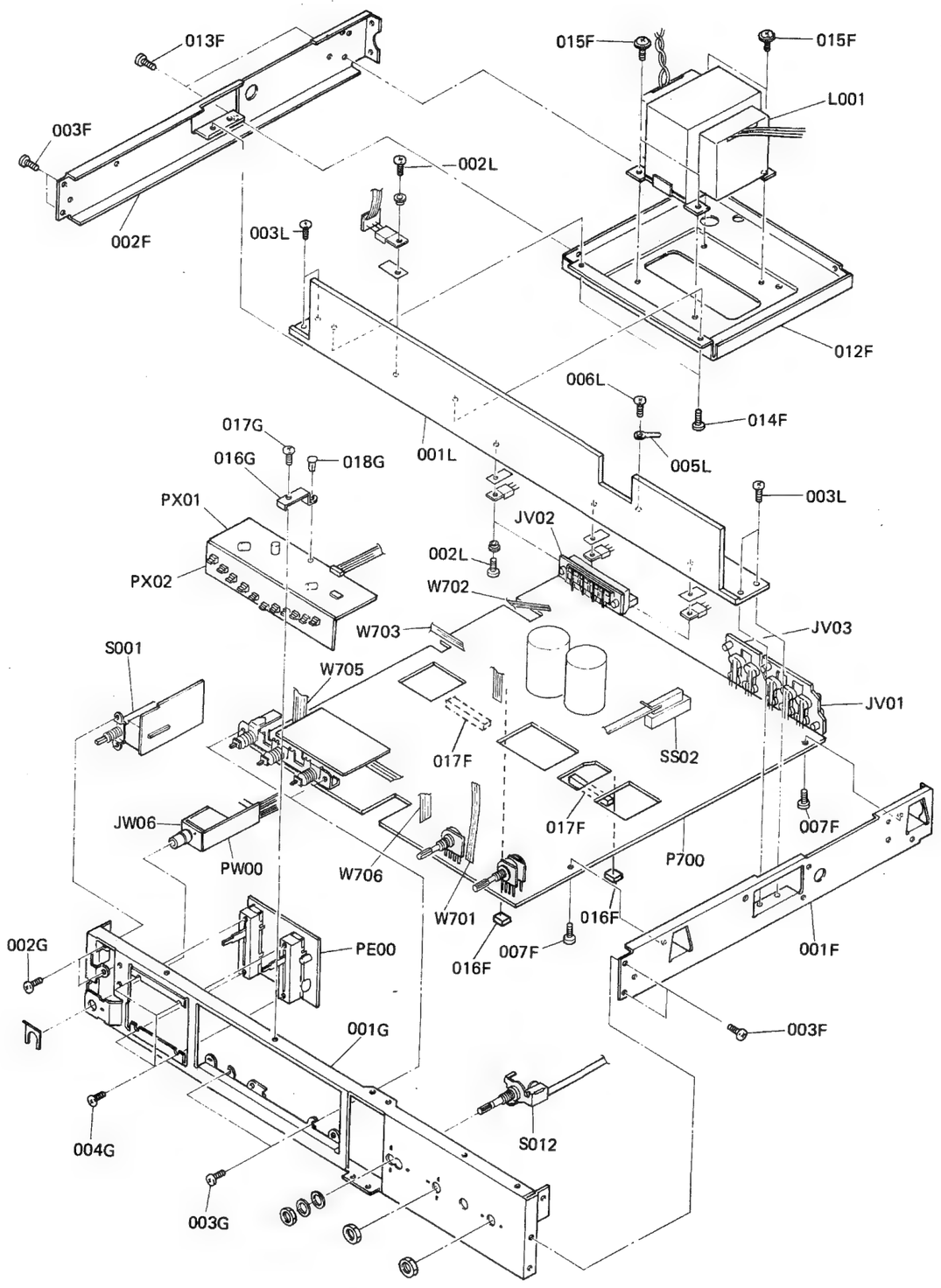


- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
001E		1		207H160230	Bracket, Rear Panel
001E			1	207H160240	Bracket, Rear Panel
001E	1			207H160210	Bracket, Rear Panel
002E	4	4	4	51280308U0	B.H. Tapped Screw B3 x 8
003E	4	4	4	51280308U0	B.H. Tapped Screw B3 x 8
004E	2	2	2	51280308U0	B.H. Tapped Screw B3 x 8
005E	2	2	2	51280308U0	B.H. Tapped Screw B3 x 8
006E	1			1455259030	Bushing
007E	2	2	2	51280308U0	B.H. Tapped Screw B3 x 8
008E		2	2	51280308U0	B.H. Tapped Screw B3 x 8
010E	1	1	1	2112265010	Indicator
014E		1		4581861010	Label
⚠ F001		1	1	FS10063800	Fuse 630mm AT
⚠ F001	1			FS10150500	Fuse 1.5A

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
⚠ J001		1	1	YJ08000290	Jack
⚠ J001	1			YJ08000310	Jack
⚠ J021	1			YJ04000740	Jack, AC Outlet
⚠ J091			1	BY05030040	Voltage Selector (220/240V)
⚠ J091		1		BY05060040	Voltage Selector (110/220V)
⚠ J092		1	1	YB04000590	Plug, Inlet
J031	1	1	1	YL03010250	Terminal, Ground
⚠ W001			1	ZC02006030	A.C. Power Cord
⚠ W001		1		ZC01805030	A.C. Power Cord
⚠ W001	1			ZC01900070	A.C. Power Cord
JW06	1	1	1	YJ01001420	Jack, Head Phone

[P01-99] Front Chassis and General Parts

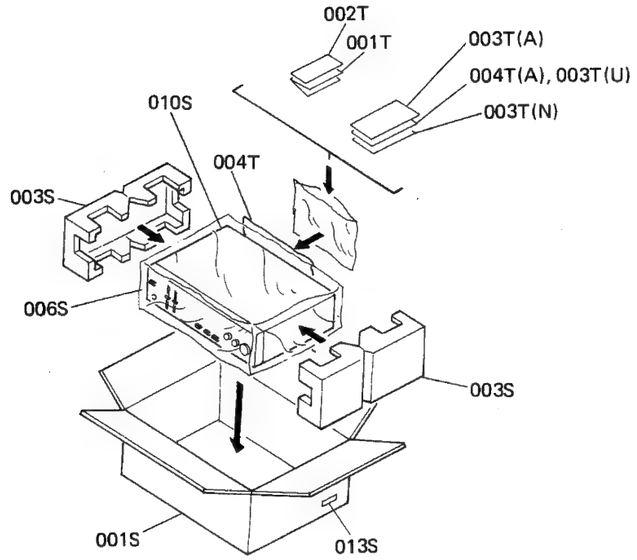


- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
001F	1	1	1	208H126010	Stay, Right
002F	1	1	1	208H126020	Stay, Left
003F	4	4	4	51280308B0	B.H. Tapped Screw B3 x 8
007F	2	2	2	51260308B0	B.T. Screw B3 x 8
012F	1	1	1	208H004010	Table
013F	2	2	2	51280308B0	B.H. Tapped Screw B3 x 8
014F	2	2	2	51260308B0	B.T. Screw B3 x 8
015F	4	4	4	51260408B0	B.T. Screw B4 x 8
016F	2	2	2	2147056010	Buffer
017F	2	2	2	208H118020	Spacer
001G	1	1	1	208H160010	Bracket, Front Chassis
002G	2	2	2	51100306A9	B.H.M. Screw B3 x 6
003G	2	2	2	51100306A9	B.H.M. Screw B3 x 6
004G	4	4	4	51100205A0	B.H.M. Screw B2 x 5
016G	1	1	1	208H160030	Bracket, Power LED PWB
017G	1	1	1	51280308B0	B.H. Tapped Screw B3 x 8
018G	1	1	1	2276005050	Clamper
001L	1	1	1	207H267010	Heatsink
002L	4	4	4	51280308B0	B.H. Tapped Screw B3 x 8
003L	4	4	4	51280308B0	B.H. Tapped Screw B3 x 8
005L	1	1	1	62030039W0	Lug
006L	1	1	1	51280308B0	B.H. Tapped Screw B3 x 8

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
⚠G001			1	DK18103850	Ceramic Cap. 0.01μF
⚠G001		1		DK18103840	Ceramic Cap. 0.01μF
⚠G001	1			DK18103530	Ceramic Cap. 0.01μF
⚠L001			1	TS16624030	Power Transformer
⚠L001		1		TS16624010	Power Transformer
⚠L001	1			TS16623010	Power Transformer
⚠S001		1	1	SP01010390	Push Switch, Power
⚠S001	1			SP01010420	Push Switch, Power
JW06	1	1	1	YJ01001420	Jack, Head Phone
S012	1	1	1	SR00030050	Rotary Switch
SS02	1	1	1	SS04040040	Slide Switch
W701	1	1	1	YU03220240	Jumper Lead, 3P
W702	1	1	1	YU03120260	Jumper Lead, 3P
W703	1	1	1	YU03300240	Jumper Lead, 3P
W704	1	1	1	YU02400240	Jumper Lead, 2P
W705	1	1	1	YU05090260	Jumper Lead, 5P
W706	1	1	1	YU04100260	Jumper Lead, 4P

[H01-99] Packing Materials



- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	Q'TY N	Q'TY A	PART NO.	DESCRIPTION
001S		1	1	207H801020	Packing Case
001S	1			207H801010	Packing Case
003S	2	2	2	001H809010	Cushion
006S	1	1	1	9090909040	Polyethylene Sheet
010S	1	1	1	2918107350	Sheet
013S			2	9526019030	Serial No. Card
013S		2		9526019060	Serial No. Card
013S	2			9526019010	Serial No. Card
019S		1		2731821010	Silicagel

REF. DESIG.	Q'TY U	Q'TY N	Q'TY A	PART NO.	DESCRIPTION
001T	1		1	207H851010	Instruction
001T		1		207H851310	Instruction
002T	1		1	207H851020	Instruction
002T		1		207H851320	Instruction
003T			1	2205851040	Instruction
003T		1		207H856010	Circuit Diagram
003T	1			2818854020	Guarantee Card
004T			1	9631000090	Guarantee Card
004T	1			2918107390	Sheet

14. ELECTRICAL PARTS LIST

- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	Q'TY N	Q'TY A	PART NO.	DESCRIPTION
					P001-POWER SW CIRCUIT BOARD
P001	1	1	1	YK207H1630	P.W. Board, Power SW
	1	1	1	ZZ207H1630	P.W. Board Assembly
					P001-CAPACITOR
G001			1	DK18103850	Ceramic 0.01μF
G001		1		DK18103840	Ceramic 0.01μF
G001	1			DK18103830	Ceramic 0.01μF
					P001-SWITCH
S001		1	1	SP01010390	Push Switch, Power
S001	1			SP01010420	Push Switch, Power
					P700-MAIN AMP CIRCUIT BOARD
P700	1	1	1	YK207H1610	P.W. Board, Main Amp
	1		1	ZZ207H1610	P.W. Board Assembly
		1		ZZ207H8610	P.W. Board Assembly
					P700-CAPACITORS
C401	1	1	1	EA33505030	Elect 3.3μF 50V
C402	1	1	1	EA33505030	Elect 3.3μF 50V
C403	1	1	1	DK16221300	Ceramic 220pF ±10%
C404	1	1	1	DK16221300	Ceramic 220pF ±10%
C405	1	1	1	DF16332300	Film 3300pF ±10%
C406	1	1	1	DF16332300	Film 3300pF ±10%
C407	1	1	1	DF16123300	Film 0.012μF ±10%
C408	1	1	1	DF16123300	Film 0.012μF ±10%
C409	1	1	1	EA33505030	Elect 3.3μF 50V
C410	1	1	1	EA33505030	Elect 3.3μF 50V
C411	1	1	1	EA10701630	Elect 100μF 16V
C412	1	1	1	EA10701630	Elect 100μF 16V
C415	1	1	1	DK18103300	Ceramic 0.01μF +80% −20%
C416	1	1	1	DK18103300	Ceramic 0.01μF
C701	1	1	1	EA33505030	Elect 3.3μF
C702	1	1	1	EA33505030	Elect 3.3μF
C703	1	1	1	DK16101300	Ceramic 100pF
C704	1	1	1	DK16101300	Ceramic 100pF ±10%
C705	1	1	1	EA10701030	Elect 1000μF 10V
C706	1	1	1	EA10701030	Elect 1000μF 10V
C707	1	1	1	EA22601630	Elect 22μF 16V
C708	1	1	1	EA22601630	Elect 22μF 16V
C709	1	1	1	EA22601630	Elect 22μF 16V
C710	1	1	1	EA22601630	Elect 22μF 16V
C711	1	1	1	DD15560370	Ceramic 56pF ±5%
C712	1	1	1	DD15560370	Ceramic 56pF ±5%
C713	1	1	1	EA10605030	Elect 10μF 50V
C714	1	1	1	EA10605030	Elect 10μF 50V
C715	1	1	1	DK17103300	Ceramic 0.01μF ±20%
C716	1	1	1	DK17103300	Ceramic 0.01μF ±20%

REF. DESIG.	Q'TY U	Q'TY N	Q'TY A	PART NO.	DESCRIPTION
C717	1	1	1	DF17332350	Film 3300pF ±20%
C718	1	1	1	DF17332350	Film 3300pF ±20%
C719	1	1	1	DF17332350	Film 3300pF ±20%
C720	1	1	1	DF17332350	Film 3300pF ±20%
C721	1	1	1	DK16101550	Ceramic 100pF ±10%
C722	1	1	1	DK16101550	Ceramic 100pF ±10%
C725	1	1	1	DF16473540	Film 0.047μF ±10%
C726	1	1	1	DF16473540	Film 0.047μF ±10%
C727	1	1	1	DD15151370	Ceramic 150pF ±5%
C728	1	1	1	DD15151370	Ceramic 150pF ±5%
⚠C803	1	1	1	EB68803520	Elect 6800μF 35V
⚠C804	1	1	1	EB68803520	Elect 6800μF 35V
C805	1	1	1	EA10703530	Elect 100μF 35V
⚠C807	1	1	1	EA33603530	Elect 33μF 35V
⚠C808	1	1	1	EA33603530	Elect 33μF 35V
C811	1	1	1	EA10505030	Elect 1μF 50V
C812	1	1	1	EA10505030	Elect 1μF 50V
CN01	1	1	1	EA33700630	Elect 330μF 6.3V
CN02	1	1	1	EA10505030	Elect 1μF 50V
CN03	1	1	1	EA33603530	Elect 33μF 35V
					P700-RESISTORS (All Resistors are ±5% and ¼W)
R401	1	1	1	GD05154140	150kΩ
R402	1	1	1	GD05154140	150kΩ
R403	1	1	1	GD05683140	68kΩ
R404	1	1	1	GD05683140	68kΩ
R405	1	1	1	GD05222140	2.2kΩ
R406	1	1	1	GD05222140	2.2kΩ
R407	1	1	1	GD05471140	470Ω
R408	1	1	1	GD05471140	470Ω
R409	1	1	1	GD05223140	22kΩ
R410	1	1	1	GD05223140	22kΩ
R411	1	1	1	GD05274140	270kΩ
R412	1	1	1	GD05274140	270kΩ
R413	1	1	1	GD05103140	10kΩ
R414	1	1	1	GD05103140	10kΩ
R415	1	1	1	GG05101140	100Ω
R416	1	1	1	GG05101140	100Ω
R417	1	1	1	GD05271140	270Ω
R418	1	1	1	GD05271140	270Ω
R701	1	1	1	GD05471140	470Ω
R702	1	1	1	GD05471140	470Ω
R703	1	1	1	GD05683140	68kΩ
R704	1	1	1	GD05683140	68kΩ
R705	1	1	1	GD05103140	10kΩ
R706	1	1	1	GD05103140	10kΩ
R707	1	1	1	GD05393140	39kΩ
R708	1	1	1	GD05393140	39kΩ
R709	1	1	1	GD05391140	390Ω
R710	1	1	1	GD05391140	390Ω
R711	1	1	1	GD05104140	100kΩ
R712	1	1	1	GD05104140	100kΩ

- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
R713	1	1	1	GD05682140	6.8kΩ
R714	1	1	1	GD05682140	6.8kΩ
R715	1	1	1	GD05682140	6.8kΩ
R716	1	1	1	GD05682140	6.8kΩ
R717	1	1	1	GD05333140	33 kΩ
R718	1	1	1	GD05333140	33 kΩ
R719	1	1	1	GD05392140	3.9kΩ
R720	1	1	1	GD05392140	3.9kΩ
R721	1	1	1	GD05392140	3.9kΩ
R722	1	1	1	GD05392140	3.9kΩ
R723	1	1	1	GD05222140	2.2kΩ
R724	1	1	1	GD05222140	2.2kΩ
R725	1	1	1	RD02020180	Trimming (B) 2kΩ
R726	1	1	1	RD02020180	Trimming (B) 2kΩ
R727	1	1	1	GD05122140	1.2kΩ
R728	1	1	1	GD05122140	1.2kΩ
R729	1	1	1	GD05152140	1.5kΩ
R730	1	1	1	GD05152140	1.5kΩ
R731	1	1	1	GD05563140	56kΩ
R732	1	1	1	GD05563140	56kΩ
R733	1	1	1	GD05151140	150Ω
R734	1	1	1	GD05151140	150Ω
R735	1	1	1	GD05333140	33kΩ
R736	1	1	1	GD05333140	33kΩ
R737	1	1	1	GD05822140	8.2kΩ
R738	1	1	1	GD05822140	8.2kΩ
R739	1	1	1	GD05822140	8.2kΩ
R740	1	1	1	GD05822140	8.2kΩ
R741	1	1	1	GD05471140	470Ω
R742	1	1	1	GD05471140	470Ω
R743	1	1	1	GD05471140	470Ω
R744	1	1	1	GD05471140	470Ω
R745	1	1	1	GG05221120	220Ω ½W
R746	1	1	1	GG05221120	220Ω ½W
R747	1	1	1	GB05272020	0.27Ω 2W
R748	1	1	1	GB05272020	0.27Ω 2W
R749	1	1	1	GB05272020	0.27Ω 2W
R750	1	1	1	GB05272020	0.27Ω 2W
R751	1	1	1	GA05100020	10Ω 2W
R752	1	1	1	GA05100020	10Ω 2W
R753	1	1	1	GG05022120	2.2 ½W
R754	1	1	1	GG05022120	2.2 ½W
R755	1	1	1	GD05561140	560Ω
R756	1	1	1	GD05561140	560Ω
R757	1	1	1	GD05273140	27kΩ
R758	1	1	1	GD05273140	27kΩ
R759	1	1	1	GD05123140	12kΩ
R760	1	1	1	GD05123140	12kΩ
R761	1	1	1	GG05100120	10Ω ¼W
R762	1	1	1	GG05100120	10Ω ¼W

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
R802	1	1	1	GA05222020	2.2kΩ
R803	1	1	1	GD05182140	1.8kΩ
⚠R805	1	1	1	GA05121010	120Ω 1W
⚠R806	1	1	1	GG05471120	470Ω ½W
R807	1	1	1	GD05272140	2.7kΩ
R808	1	1	1	GD05272140	2.7kΩ
⚠R809	1	1	1	GA05820030	82Ω 3W
⚠R810	1	1	1	GA05390010	39Ω 1W
RN01	1	1	1	GD05471140	470Ω
RN02	1	1	1	GD05471140	470Ω
RN03	1	1	1	GD05103140	10kΩ
RN04	1	1	1	GD05474140	470kΩ
RN05	1	1	1	GD05154140	150kΩ
RN06	1	1	1	GD05124140	120kΩ
RN07	1	1	1	GD05104140	100kΩ
					P700-SEMICONDUCTORS
Q401	1	1	1	HC10003090	IC 4558D
Q701	1	1	1	HT107502C0	Transistor 2SA750 E or F
Q702	1	1	1	HT107502C0	Transistor 2SA750 E or F
Q703	1	1	1	HT107502C0	Transistor 2SA750 E or F
Q704	1	1	1	HT107502C0	Transistor 2SA750 E or F
Q705	1	1	1	HD20003210	Diode IS2471
Q706	1	1	1	HD20003210	Diode IS2471
Q707	1	1	1	HT314001E0	Transistor 2SC1400 (E)
Q708	1	1	1	HT314001E0	Transistor 2SC1400 (E)
Q709	1	1	1	HT309452B0	Transistor 2SC945 P or Q
Q710	1	1	1	HT309452B0	Transistor 2SC945 P or Q
Q711	1	1	1	HT322402A0	Transistor 2SC2240 GR or BL
Q712	1	1	1	HT322402A0	Transistor 2SC2240 GR or BL
Q713	1	1	1	HD20001210	Diode IS2473
Q714	1	1	1	HD20001210	Diode IS2473
Q715	1	1	1	HD20001210	Diode IS2473
Q716	1	1	1	HD20001210	Diode IS2473
Q717	1	1	1	HD20001210	Diode IS2473
Q718	1	1	1	HD20001210	Diode IS2473
Q719	1	1	1	HD20001210	Diode IS2473
Q720	1	1	1	HD20001210	Diode IS2473
Q721	1	1	1	HT309452B0	Transistor 2SC945 P or Q
Q722	1	1	1	HT309452B0	Transistor 2SC945 P or Q
Q723	1	1	1	HT107332A0	Transistor 2SC733 P or Q
Q724	1	1	1	HT107332A0	Transistor 2SC733 P or Q
Q725	1	1	1	HT322742B0	Transistor 2SC2274 E or F
Q726	1	1	1	HT322742B0	Transistor 2SC2274 E or F
Q727	1	1	1	HT109842B0	Transistor 2SA984 E or F
Q728	1	1	1	HT109842B0	Transistor 2SA984 E or F
⚠Q729	1	1	1	HT406133B0	Transistor 2SD613 DE or F
⚠Q730	1	1	1	HT406133B0	Transistor 2SD613 DE or F
⚠Q731	1	1	1	HT206333B0	Transistor 2SB633 DE or F
⚠Q732	1	1	1	HT206333B0	Transistor 2SB633 DE or F
⚠Q801	1	1	1	HD20008290	Diode S4VB20
⚠Q805	1	1	1	HD20015030	Diode DS135D
Q806	1	1	1	HD30014010	Zener HZ16L
⚠Q807	1	1	1	HT405712B0	Transistor 2SD571
⚠Q808	1	1	1	HT107332A0	Transistor 2SA733 P or Q
Q809	1	1	1	HD30014010	Zener HZ16L
Q810	1	1	1	HD30014010	Zener HZ16L
Q812	1	1	1	HD30042090	Zener BZ052

- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
QN01	1	1	1	HT309452B0	Transistor 2SC945 P or Q
QN02	1	1	1	HT309452B0	Transistor 2SC945 P or Q
QN03	1	1	1	HD20015030	Diode DS135D
QN04	1	1	1	HT309452B0	Transistor 2SC945 P or Q
QN05	1	1	1	HT107332A0	Transistor 2SA733 P or Q
QN06	1	1	1	HD30023090	Zener WZ071
					P700-MISCELLANEOUS
L701	1	1	1	LL23905120	Choke Coil
L702	1	1	1	LL23905120	Choke Coil
⚠F801		1		FS10315800	Fuse
⚠F802		1		FS10315800	Fuse
RS07	1	1	1	RM01040400	Variable Resistor 100kΩx2
RS08	1	1	1	RK02040110	Variable Resistor 200kΩ
SS02	1	1	1	SS04040040	Slide Switch
JV01	1	1	1	YT02060130	Terminal
JV02	1	1	1	YT02040260	Terminal
JV03	1	1	1	YT03040190	Terminal
					P701-POWER TR. CIRCUIT BOARD
P701	1	1	1	YK207H1620	P.W. Board, Power TR.
	1	1	1	ZZ207H1620	P.W. Board Assembly
					P701-TRANSISTOR
Q729	1	1	1	HT406133B0	Transistor 2SD613 DE or F
					PE00-TONE CONTROL CIRCIT BOARD
PE00	1	1	1	YK207H1650	P.W. Board, Tone Control
	1	1	1	ZZ207H1650	P.W. Board Assembly
					PE00-CAPACITORS
CE01	1	1	1	EA10603530	Elect 10μF 35V
CE02	1	1	1	EA10603530	Elect 10μF 35V
CE03	1	1	1	DF16393300	Film 0.039μF ±10%
CE04	1	1	1	DF16393300	Elect 0.039μF ±10%
CE05	1	1	1	EA33405030	Elect 0.33μF 50V
CE06	1	1	1	EA33405030	Elect 0.33μF 50V
CE07	1	1	1	DK16181300	Ceramic 180pF ±10%
CE08	1	1	1	DK16181300	Ceramic 180pF ±10%
CE09	1	1	1	DF16122300	Film 1200pF ±10%
CE10	1	1	1	DF16122300	Film 1200pF ±10%
CE11	1	1	1	DF16123300	Film 0.012μF ±10%
CE12	1	1	1	DF16123300	Film 0.012μF ±10%
CE13	1	1	1	EA10405030	Elect 0.1μF 50V
CE14	1	1	1	EA10405030	Elect 0.1μF 50V

REF. DESIG.	Q'TY U	N	A	PART NO.	DESCRIPTION
					PE00-RESISTORS (All Resistors are ±5% and ¼W)
RE01	1	1	1	GD05682140	6.8k
RE02	1	1	1	GD05682140	6.8k
RE03	1	1	1	RS05030350	Variable 50kΩx2
RE04	1	1	1	RS05030350	Variable 50kΩx2
RE05	1	1	1	GD05821140	820Ω
RE06	1	1	1	GD05821140	820Ω
RE07	1	1	1	GD05680140	68Ω
RE08	1	1	1	GD05680140	68Ω
RE09	1	1	1	GD05821140	820Ω
RE10	1	1	1	GD05821140	820Ω
RE11	1	1	1	GD05121140	120Ω
RE12	1	1	1	GD05121140	120Ω
					PS00-SW/VR ASS'Y CIRCUIT BOARD
PS00	1	1	1	YK207H1660	P.W. Board, SW/VR Ass'y
	1	1	1	ZZ207H1660	P.W. Board Assembly
					PS00-CAPACITORS
CS01	1	1	1	DK16271300	Ceramic 270pF ±10%
CS02	1	1	1	DK16271300	Ceramic 270pF ±10%
CS03	1	1	1	DF16683300	Film 0.068μF ±10%
CS04	1	1	1	DF16683300	Film 0.068μF ±10%
					PS00-RESISTORS (All Resistors are ±5% and ¼W)
RS01	1	1	1	GD05472140	4.7kΩ
RS02	1	1	1	GD05472140	4.7kΩ
RS03	1	1	1	GD05273140	27k Ω
RS04	1	1	1	GD05273140	27k Ω
RS05	1	1	1	GD05822140	8.2kΩ
RS06	1	1	1	GD05822140	8.2kΩ
					PS00-SWITCH
SS01	1	1	1	SP020301100	Push Switch
					PW00-PHONE ASS'Y CIRCUIT BOARD
PW00	1	1	1	YK207H1640	P.W. Board, Phone Ass'y
	1	1	1	ZZ207H1640	P.W. Board Assembly
RW01	1	1	1	GA05331010	Resistor 330Ω ±5% 1W
RW02	1	1	1	GA05331010	Resistor 330Ω ±5% 1W
JW06	1	1	1	YJ01001420	Head Phone Jack
					PX01-LED LEVEL METER DRIVE CIRCUIT BOARD
PX01	1	1	1	WN207H3210	P.W. Board, LED Level Meter Drive
				ZZ207H3210	P.W. Board Assembly
					PX01-CAPACITORS
CX01	1	1	1	EA33505030	Elect 3.3μF 50V
CX02	1	1	1	EA33505030	Elect 3.3μF 50V
CX03	1	1	1	EA10505030	Elect 1μF 50V
CX04	1	1	1	EA10505030	Elect 1μF 50V
CX05	1	1	1	DF16103300	Film 0.01μF ±10%
CX06	1	1	1	DF16103300	Film 0.01μF ±10%

- U for U.S.A.
- N for Europe
- A for Australia

REF. DESIG.	Q'TY U	N	A	PART No.	DESCRIPTION
					PX01-RESISTORS (All Resistors are ±5% and ¼W)
RX01	1	1	1	GD05103140	10kΩ
RX02	1	1	1	GD05103140	10kΩ
RX03	1	1	1	GD05104140	100kΩ
RX04	1	1	1	GD05104140	100kΩ
RX07	1	1	1	RA02030060	Trimming 20kΩ
RX08	1	1	1	RA02030060	Trimming 20kΩ
RX25	1	1	1	GD05563140	56kΩ
RX26	1	1	1	GD05563140	56kΩ
RX27	1	1	1	GD05183140	18kΩ
RX28	1	1	1	GD05183140	18kΩ
					PX01-SEMICONDUCTORS
QX01	1	1	1	HD30076090	Zener WZ038
QX02	1	1	1	HD30076090	Zener WZ038
QX03	1	1	1	HD20001210	Diode IS2473
QX04	1	1	1	HD20001210	Diode IS2473
QX05	1	1	1	HC10008370	IC TL489C
QX06	1	1	1	HC10008370	IC TL489C
QX07	1	1	1	HC10019020	IC AN6552
QX21	1	1	1	HD20001210	Diode IS2473
QX22	1	1	1	HD20001210	Diode IS2473
					PX01-MISCELLANEOUS
JX01	1	1	1	YJ07000750	Jack
					PX02-LED LEVEL METER CIRCUIT BOARD
PX02	1	1	1	WN207H3220	P.W. Board,LED Level Meter
	1	1	1	ZZ207H3220	P.W. Board Assembly
					PX02-RESISTORS (All Resistors are ±5% and ¼W)
RX10	1	1	1	GD05271140	270Ω
RX11	1	1	1	GD05561140	560Ω
RX12	1	1	1	GD05561140	560Ω
RX13	1	1	1	GD05561140	560Ω
RX14	1	1	1	GD05561140	560Ω
RX15	1	1	1	GD05561140	560Ω
RX16	1	1	1	GD05561140	560Ω
RX17	1	1	1	GD05561140	560Ω
RX18	1	1	1	GD05561140	560Ω
RX19	1	1	1	GD05561140	560Ω
RX20	1	1	1	GD05561140	560Ω
					PX02-SEMICONDUCTORS
QX08	1	1	1	HI10006320	L.E.D. GL-9NG9
QX09	1	1	1	HI10007320	L.E.D. GL-9PR9
QX10	1	1	1	HI10007320	L.E.D. GL-9PR9
QX11	1	1	1	HI10007320	L.E.D. GL-9PR9
QX12	1	1	1	HI10007320	L.E.D. GL-9PR9
QX13	1	1	1	HI10007320	L.E.D. GL-9PR9
QX14	1	1	1	HI10007320	L.E.D. GL-9PR9
QX15	1	1	1	HI10007320	L.E.D. GL-9PR9
QX16	1	1	1	HI10007320	L.E.D. GL-9PR9
QX17	1	1	1	HI10007320	L.E.D. GL-9PR9
QX18	1	1	1	HI10007320	L.E.D. GL-9PR9

(W01-99)	Assembly and Wiring
(T01-99)	Adjustment
(X01-00)	Correction

15. TECHNICAL SPECIFICATIONS

AUDIO SECTION

POWER OUTPUT, DIN, 8 OHM, PER CHANNEL **28W**
POWER OUTPUT, RMS 1 kHz, 8 OHM, PER CHANNE **25W**
TOTAL HARMONIC DISTORTION AT RATED POWER OUTPUT **0.3%**
I.M. DISTORTION AT RATED POWER OUTPUT
(250 Hz AND 8 kHz MIXED, AMPLITUDE RATIO 4:1) **0.3%**
POWER BANDWIDTH ..... **10 Hz ~ 30 kHz**
DAMPING FACTOR 8 OHM **50**

Frequency Response
Phono (RIAA) ..... ±1.0 dB
Aux (±1 dB) ..... 15 Hz ~ 50 kHz
Signal-to-Noise Ratio (IHF-A Network)
Phono (MM) ..... 74 dB
Aux ..... 96 dB
Input Terminals
Phono: Input Impedance ..... 47 k ohms
Input Capacitance ..... 250 pF
Overload Margin ..... 33 dB
Input sensitivity ..... 2.8 mV
Aux: Input Impedance ..... 25 k ohms
Input Sensitivity ..... 150 mV
Phono Equivalent Input Noise ..... 0.5 μV
Phono Dynamic Range (Ratio of input overload to equivalent input noise) ..... 93 dB
Channel Balance (0 to –40 dB/40 Hz ~ 16 kHz)
Phono ..... Less than 2.0 dB
Aux ..... Less than 2.0 dB
Output Voltage, 1 kHz
Tape Out ..... 415 mV
Output Impedance, 1 kHz
Tape Out ..... 220 ohms

GENERAL

Power Requirements ..... 220 V AC, 50 Hz
(N version is featuring an external voltage selector for use on 110V. Other versions can be converted by a qualified technician to operate on 240V.)
Power Consumption at Rated Output, both Channels Driven 105W
Idling Power 16W
Semiconductor Complement
Transistors 29
Diodes 22
Integrated Circuits 4
Dimensions
Panel Width ..... 416 mm
Panel Height ..... 73 mm
Depth ..... 302 mm
Weight
Unit Alone ..... 4.8 kg

Specifications and appearance are subject to change for modification without notice.